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UNITED STATES DEPARTMENT OF AGRICULTURE  
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING  
WASHINGTON, D. C.

FIELD LETTER FOR MARCH

No. 14

April 1, 1916.

DIVISION OF CONSTRUCTION

V. M. Peirce, Chief.

Projects:

Advice and Inspection

W. F. Brooks, S.H.E., completed the preparation of a report for a system of roads for Luce Township, Spencer County, Indiana, March 13, and returned to Paducah, Kentucky, resuming his cooperative work with the State Highway Commission.

H. K. Craig, H.E., completed the survey of a system of roads in Wayne County, North Carolina, on March 28, and has been assigned to assist the County Engineer of Randolph County on similar work.

W. A. Crossland, S.H.E., who has been assisting the State Highway Commission of Alabama with its institute work, completed that assignment March 25 and has been assigned to cooperate with the State and county authorities in preparing plans and specifications for a proposed road from Birmingham to the head of navigable waters of the Warrior River.

Mack Galbreath, J.H.E., who for some time assisted R. F. Eastham, of the Division of Economics, in conducting a model convict camp near Atlanta, Georgia, was assigned March 7 to take charge of constructing a system of roads for Eastville District, Northampton County, Virginia. H. L. Arbenz was in charge of this work until he resigned from the Office.

R. H. Harrison, J.H.E., gave an illustrated lecture on the evening of March 16, at a meeting of the Texas Good Roads Association, at Taylor, Texas.

L. I. Hewes, S.H.E., during the month of March delivered lectures at the State Agricultural and Mechanical College, Manhattan, Kansas; at Omaha, Nebraska; at Beckley, and eight other points in Raleigh County, West Virginia. He also conferred with the St. Louis County authorities with reference to the taking of a traffic census of roads proposed to be built under a \$3,000,000 bond issue voted February 15.

H. H. Lotter, S.H.E., addressed the meeting of the Jefferson Davis Highway Association at Grenada, Mississippi, March 2. He was assigned March 20 to plan a county road system for Tallahatchie County, Mississippi.

W. H. Lynch, S.H.E., completed an investigation of the amount of work done by the contractors in the Third Supervisors' District of Prentiss County, Mississippi, March 10. He then prepared an estimate of the cost of improving a cross-country road in Unicoi County, Tennessee, and was assigned March 28 to assist in preparing plans and specifications for the improvement of that part of the Reno-Carson City Road in Washoe County, Nevada.



G. D. Marshall was at Osceola, Arkansas, March 8 to 11, advising with the officials as to the proper methods of improving certain roads in the Osceola and Little River District. He also addressed the Four States Good Roads Association at Texarkana, Arkansas, on March 23. Upon the completion of this lecture and assignment, Mr. Marshall proceeded to DeKalb, Mississippi, to assist the county officials in locating and improving the Jackson Highway through Kemper County.

C. H. Sweetser, S.H.E., completed the county system assignment in Greenbrier County, West Virginia, March 18, and since that time has been cooperating with the State Road Bureau of West Virginia, on general road work in the State.

R. E. Toms, S.H.E., March 1-3, investigated and advised relative to the use of gravel on road construction work in Claiborne County, Tennessee.

H. C. Wells, S.R.C., completed his work of cooperating with the State Department of Highways of Tennessee in designating an intercounty seat system of roads on March 25, and has been assigned to assist the Chief Engineer of the State Road Bureau of West Virginia in general road work over that State.

J. C. Wonders, S.H.E., was assigned March 19 to plan a county system for Clay County, Missouri.

H. S. Parry, J.H.E., was assigned March 27 to assist R. F. Eastham on construction work in connection with the model county convict camp near Atlanta, Georgia.

A. L. Hooper, J.H.E., was assigned to assist J. J. Tobin of the Division of Economics, on a good roads train which is now being operated through Iowa.

#### County Superintendence

J. H. Dodge, S.R.C., was assigned March 31 to prepare a county road system for Perkins County, South Dakota.

#### Object-Lesson Roads

G. D. Marshall, S.R.C., completed a gravel object-lesson road at Forrest City, Arkansas, March 6.

#### DIVISION OF MAINTENANCE

E. W. James, Chief.

#### Projects:

#### Advice, Inspection and Lectures

J. H. Eldridge, S.C., made an inspection of roads at Haymarket, Virginia, on March 3 and 16.

D. H. Winslow, S.C., delivered a lecture at Wilmington, N. C., on March 7, and inspected the road maintenance organization of New Hanover County. He repeated his illustrated lecture on "Maintenance of the Washington-Atlanta Highway" at Lumberton, N. C., on March 9, and conferred with the county officials regarding maintenance.

1. The first part of the paper is devoted to a general discussion of the problem.

2. The second part is devoted to a detailed study of the case of a single particle.

3. The third part is devoted to a study of the case of a system of particles.

4. The fourth part is devoted to a study of the case of a system of particles.

5. The fifth part is devoted to a study of the case of a system of particles.

6. The sixth part is devoted to a study of the case of a system of particles.

7. The seventh part is devoted to a study of the case of a system of particles.

8. The eighth part is devoted to a study of the case of a system of particles.

9. The ninth part is devoted to a study of the case of a system of particles.

10. The tenth part is devoted to a study of the case of a system of particles.

11. The eleventh part is devoted to a study of the case of a system of particles.

Mr. Winslow lectured at Oxford, N. C., on March 14; attended and addressed a meeting of the commissioners of Johnston County, N. C., at Smithfield on the 24th, and attended a meeting of the commissioners at Fayetteville on the 25th. This is the season when applications are being renewed for maintenance supervision on the Washington-Atlanta Highway.

On March 30, Mr. Winslow attended a conference, in company with W. S. Fallis, State Highway Engineer of North Carolina, at Mebane and Graham, to assist the commissioners in designating for improvement certain sections of road, which will become part of the Central Highway.

On March 31, Mr. Winslow was at Elizabeth City, where he addressed a meeting of the Farmers' Union in the afternoon and of the business men in the evening.

W. L. Spoon, S.H.E., was present at Albemarle, N. C., March 9 and 10, where he delivered a lecture and conferred with the officials regarding maintenance.

V. E. Towles, H.E., who has been ill with appendicitis, hopes to return to his assignment on the Washington-Atlanta Highway in North Carolina about April 15.

Mr. James attended the annual meeting of County Supervisors at Kittanning, Pennsylvania, on March 9, in company with Commissioner Cunningham of Pennsylvania.

L. L. Winans, J.H.E., has been transferred to this Division from the Division of Construction and assigned to Howard County, Indiana, where he will have supervision of the maintenance of bond-aided roads. Mr. Winans arrived at Kokomo, March 15, and will be stationed there indefinitely. Mr. James was in Kokomo from March 13 to 16, conferring with the county officials and arranging for Mr. Winans to assume his duties in the county.

Preparations have been made for an inspection tour over the Central Highway in North Carolina during the month of April. All county officials concerned and the trustees of the Central Highway in each county have been notified of the inspection and furnished with an itinerary, so that they may be ready for a conference when the inspection party reaches their respective counties. Mr. James will represent the Office of Public Roads and Rural Engineering and will be accompanied by Mr. Winslow and Mr. Spoon over sections of the road which they will probably have under supervision, and the State Highway Commission will be represented by W. S. Fallis, State Highway Engineer.

#### Washington-Atlanta Highway

Reports of the condition of the road have been most favorable. Mr. Scales, who has the Georgia Section, reported during the month that the entire road in that section has remained open during the winter for the first time in twenty years, and that at the time of his last general inspection trip, the road was in better condition, as a whole, than he had ever seen it.

Mr. Winslow reports that the Boydton District, Mecklenburg County, Virginia, is arranging to give the road ten feet additional width at all sharp curves and is planning to set out shade trees on some sections. At Oxford, Granville County, N. C., interested persons are planning to set hedges and flower beds at prominent points.



1. The first part of the report  
describes the general situation  
of the country and the  
state of the economy.

2. The second part of the report  
describes the results of the  
survey and the conclusions  
drawn from it.

3. The third part of the report  
describes the measures  
taken to improve the  
situation and the results  
achieved.

4. The fourth part of the report  
describes the future plans  
for the country and the  
state of the economy.

5. The fifth part of the report  
describes the results of the  
survey and the conclusions  
drawn from it.

6. The sixth part of the report  
describes the measures  
taken to improve the  
situation and the results  
achieved.

7. The seventh part of the report  
describes the future plans  
for the country and the  
state of the economy.

8. The eighth part of the report  
describes the results of the  
survey and the conclusions  
drawn from it.

9. The ninth part of the report  
describes the measures  
taken to improve the  
situation and the results  
achieved.

10. The tenth part of the report  
describes the future plans  
for the country and the  
state of the economy.

11. The eleventh part of the report  
describes the results of the  
survey and the conclusions  
drawn from it.

12. The twelfth part of the report  
describes the measures  
taken to improve the  
situation and the results  
achieved.



A traffic census taken about half way between Durham and Oxford, N. C., from May 1, 1915, to February 1, 1916, on week days from 8 A. M. to 6 P. M., shows 6,747 automobiles. In January, 1915, the records show no automobiles over the road and in January, 1916, with approximately one inch heavier rainfall for the month, the records show 383 automobiles. The point at which the census was taken is remote from any large town, so that the census record practically excluded strictly local traffic; it represents through traffic between towns or automobiles on tour.

Mr. James left Washington March 30 to confer with Mr. Scales and county officials in Georgia regarding the continuance of maintenance supervision on the Washington-Atlanta Highway in that State.

#### Field Experiments

##### Mt. Vernon Avenue, Alexandria County, Virginia.

On March 10 and 11 sections 3 and 4 were given a seal coat, using a coal-tar preparation.

Materials have been ordered for renewing the seal coat on sections 17, 18, 19, and 20.

An order has been placed for a coal-tar preparation to be used in making cold patches. This material has a somewhat different specification than that now being used and careful comparisons will be made between the effectiveness of the two materials. It is intended to try out other cold patching materials also during the present season on this and other roads under field experiments.

On March 25, Messrs. Peirce, Hubbard, and James made a general inspection of the Mt. Vernon Avenue road and of the Virginia Post Road in Fairfax County, for the purpose of considering the bitumen most feasible on the Virginia Post Road. If the Virginia Post Road is given a bituminous wearing surface, it will become an experimental road under this project.

##### Cost Data.

Cooperation with local officials is now in force with the following, who will furnish monthly reports on maintenance charges against certain selected sections of improved road under their supervision:

L. D. Barrows, Augusta, Me., for the State Highway Commission.  
Fred Shutts, Lake Charles, La., for Calcasieu Parish.  
H. J. Kuehling, Milwaukee, Wis., for Milwaukee County.  
T. H. Edwards, Montgomery, Ala., for Montgomery County.  
J. K. Denham, Hattiesburg, Miss., for Forrest County.  
J. C. Dayton, Auburn, N. Y., for Cayuga County.  
A. H. Hinkle, Columbus, Ohio, for the State Highway Commission.

It is probable that cooperation will be effected with Essex and Atlantic Counties, N. J.; Milton, Massachusetts; and Berrien and Genesee Counties, Michigan.

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In connection with this cooperative work, Mr. James visited the State Highway Commission at Lansing, Michigan, on March 10 and 11, and conferred with the commissioners of Genesee and Berrien Counties at Flint and St. Joseph, Michigan, on March 11, 12, and 13.

#### DIVISION OF NATIONAL PARK AND FOREST ROADS

T. Warren Allen, Chief.

Projects:

##### National Forests

District 2. A. E. Palen, H.E., in charge.

Field: The ranger crew in the Jarre Canon Section of the Sedalia-Decker Springs Road, who are operating the machine drill on rock work, have made a good showing during the past month of very good weather. This work will close March 31, when the rangers return to their district. The supervision and equipment will then be transferred for the completion of the Monument Nursery Road in April. The latter was closed last December on account of bad storms.

The main camp on the Sylvan Lake-Hill Section of the Deadwood-Hot Springs Road was closed February 20. Since then the ranger portion of the crew have been clearing on another section on this road between Custer and Hill City.

Office: Plans have been completed for the Idaho Springs-Central City, Montrose-Horsefly, the Coal Creek Section of the West Dolores River, and the Sedalia-Decker Springs Roads, and work is now under way for the completion of the preliminary location plans of the Platte Canon Road and the location plans of the Nederland-Ward and the Sunday Gulch Section of the Deadwood-Hot Springs Roads. This work has been carried on by three and four assistant engineers in the office during the winter. The total office work is about 80 per cent completed. Committee work on the several committees for road studies and plans, on which Mr. Palen has been assigned, has progressed to about 75 per cent of completion.

District 4. C. H. Kendall, S.H.E., in charge.

Upon the Payette River Road, Idaho, a small crew are working between the Oxbow and Deadwood upon a twelve hundred foot section of rock excavation to reduce grade. A considerable time has been employed in keeping the road open between Gallangiers and the Oxbow, a ten mile section where frequent slides occur in the Spring.

Upon the Secret Pass Road, Nevada, work was resumed the 8th and the section of about nine hundred feet of heavy rock excavation will soon be completed permitting this road to be opened to the public for travel to the Ruby Valley.

Upon the Ephraim-Orangeville Road, Utah, a force of Rangers built a temporary camp for construction work in the Straight Canyon section and a force of six rangers and twelve single hands have completed about twelve hundred feet of heavy grading and rock excavation. On the 14th an additional force of twenty men and teams were organized for work upon the construction of the eight and one-half miles from Straight Canyon to Orangeville outside the Forest in Emery County.



On the Ephraim end of the road, there is available, \$10,000 appropriation by the State and San Pete County and construction work will be inaugurated on another three and one-half mile section April 3rd, under the Forestry supervision.

In the office, Mr. Peterson, who was temporarily transferred to the office the 10th, has completed maps of the Modena-St. George, Utah, survey. Mr. J. Brown is completing the cross-section and quantities of the Gibbonsville-Continental Divide survey, Idaho. Mr. R. Brown is working up plans and profile of the Payette River Extension survey, Idaho. Mr. Calvert is in the field cross-sectioning the located line upon the Ephraim-Orangeville Road for construction work.

The weather has been very unsettled with severe storms in some sections.

District 5. C. C. Morris, H.E., in charge.

Trinity River Road: The right-of-way clearing which was begun in the month of November, 1915, by day labor forces was completed on the 27th of February. This date was three months earlier than that fixed by any of the proposals which were received in October, 1915, and rejected by the District Forester. There were 424 stations cleared to a width of forty feet and 20 stations cleared to a width of sixty feet. The average cost per station for the 444 stations was \$6.80 which figure includes all materials and subsistence supplies used as well as labor.

About March 15th the survey party began setting slope stakes for grading and a small force began preliminary grading work. Proposals were put out for tools and equipment necessary for grading the entire project.

Laguna Road: The survey of this project was completed on February 26 and the party disbanded. The mapping and design were prosecuted in the San Francisco office, one draftsman being employed on this.

A considerable amount of correspondence necessary for the lining up of new projects was attended to by the Highway Engineer.

Mr. Norcross, Assistant Chief Engineer of the Forest Service, visited the District Office about the 10th instant and a three-day conference concerning road affairs was had. The most particular thing covered was the annual statistical report required by the Chief Engineer of the Forest Service. This report goes back to the beginning of all projects on which "10 per cent road money" has been spent since 1912, and a large amount of work has been required in searching old accounts.

District 6. B. J. Finch, S.H.E., in charge.

During the month of March the work which has been done in the office has consisted mainly in finishing up various details on the plans of the Elk Creek Road in the Umpqua National Forest, the McKenzie River Road in the Cascade National Forest, and the Blewett Pass Road in the Wenatchee National Forest.

The data for the annual cumulative report has been revised, it still remaining to finally complete the checking of this report in accordance with instructions





of Mr. Norcross, Assistant Chief Engineer of the Forest Service, given at the time of his recent visit to this Office.

Work has begun on the plans for the Loup Road in the Okanogan National Forest. Survey for this was made in July, 1915. It is not expected that any construction work will be done on this road during the coming season, this road being intended as No. 3 on project lists for the State of Washington.

Construction work has been going forward during the month on the Elk Creek Road in the Umpqua National Forest, with a force of about 25 men. With the improvement of weather conditions some additional equipment is being purchased in the way of industrial track and cars and a small stiff-leg derrick. The excavation on this road is now mostly in rock and loose rock, making it necessary to have some mechanical means of handling the material, particularly for the construction of rough walls and riprap which is necessary in some of the canyons which are crossed.

Skamania County Work. J. T. Schuyler, S.H.E., in charge.

The construction work on the Stevenson-Collins Road has not progressed very rapidly because of the weather conditions during the past month. Most of the culverts are constructed and about 60 per cent of the grading is completed. In addition to the grading there are about 1,000 linear feet of timber trestle and bridges yet to build. The work was sublet to station gangs, which made it necessary to keep two parties staking out, but now that the grades and line are set, it will be necessary to have but one field party.

The bids for the Mill A - Underwood Road which is eleven miles in length, were opened on March 4. Eight bids ranging from \$39,582.60 to \$49,997.10, were received. The contract was awarded to the lowest bidder, the General Construction Company of Spokane, who have a good reputation for this kind of work. The bid was well balanced; the main items being earth excavation at \$.20 per cubic yard; solid rock at \$.70; and loose rock at \$.35 per cubic yard. A field party is staking out the work for construction and have about 50 per cent of it completed. The Contractor expects to start work about April 1.

The plans and estimate for the Clark County Line - Cascades Road are completed and bids for this work will be opened on April 15. The estimate calls for the grading of 20 miles of line but as one-half of this consists of widening and straightening an existing road, the quantities are rather small and it is expected the item prices will be slightly larger than those for the work which has been let. Parties are staking out this work now. It is planned to have most of the staking done before the contract is awarded.





DIVISION OF ROAD MATERIAL TESTS AND RESEARCH  
Prévost Hubbard, Chief.

Projects:

Administration

Anthony Norkewicz, Student Assistant, resigned on March 7. D. A. Gardiner has been transferred from the Physical Laboratory to the Concrete Laboratory to take Mr. Norkewicz' place.

Routine Tests and Analyses

During March thirty-five samples were examined in the Chemical Laboratory. Twenty-seven were bituminous material and eight metal-galvanized. Sixty samples of rock, sand, gravel, etc., were examined in the Physical Laboratory and about that number were examined and classified in the Microscopic Laboratory.

Research Upon the Properties of Dust Preventives and Road Binders

The investigation on the relative binding power of bituminous materials with different rocks is progressing and preliminary work incidental to the study of the thickness of bituminous films in bituminous aggregates has been started.

A contract has been let for the installation of the bituminous-materials refining plant at Arlington Farm, and it is expected that this plant will be completed by the first of June.

Work is being continued relative to perfecting a standard cell for counting ultra-microscopic particles in solutions of bituminous materials and standardizing the method of preparing samples for count.

Non-Bituminous Road Material Investigations

Tests have been started to determine the effect of alternate freezing and thawing upon argillaceous road materials, such as argillaceous limestone.

It is expected that during the month of April the large impact machine will have been so modified as to make possible the testing of sections of brick pavement by impact in order to determine the effect of various types of cushions and fillers.

Standardization of Methods of Testing

Mr. Pritchard is continuing work upon the standardization of the paraffine scale determination with a view to finding an absorbent filtering medium which will give concordant check results. A paper entitled "A New Penetration Needle for Use in Testing Bituminous Materials," by Messrs. Reeve and Pritchard, was published in the Journal of Agricultural Research, March 13, 1916.

Department Bulletin 347 on "Methods for the Determination of the Physical Properties of Road-Building Rock," by Mr. Jackson, was issued on March 17.

A large amount of work has been done during the month relative to accumulating data upon the determination of the specific gravity of non-homogeneous aggregates by various methods. This work will be completed about April 1.



Some data has also been compiled relative to a proposed standard abrasion test for gravel, a subject which is at present being considered by Committee D-4 of the American Society for Testing Materials. It is hoped that the investigation of this test may be pushed rapidly during April.

On March 29, Mr. Hubbard attended a meeting of the Sub-Committee on Nomenclature of Bituminous Materials, American Society for Testing Materials, in New York City, and also a Joint Conference Committee meeting, composed of members of the Committee on Standard Tests for Concrete, and Standard Tests for Road Materials.

#### Experimental Bituminous Road Construction and Maintenance

On March 7, Mr. Reeve proceeded to West Palm Beach, Florida, for the purpose of furnishing inspection and advice relative to the construction of a considerable mileage of bituminous highway built of soft coralline rock. Mr. Reeve will probably not return to Washington until the early part of April. During this assignment he delivered an address before the Florida Good Roads Association on March 23 at St. Augustine.

On March 10, Mr. Hubbard inspected the surface treatment with tar of the experimental bituminous concrete section constructed with a sandstone aggregate, on the Washington-Alexandria Road. On March 25, Mr. Hubbard cooperated with Messrs. Peirce, James, and Eldridge in an inspection of the experimental road sections between Washington and Alexandria, and also the gravel road built under the supervision of the Office from Alexandria to Gum Springs, Virginia. Mr. Hubbard made an inspection of the experiments on Hillside Avenue, Jamaica, New York, on March 31.

#### Concrete Investigations

During the month tests have been completed on reinforced concrete slabs 6 inches and 3 inches in depth. These two slabs were the first of a series to determine the variation in effective width resulting from different depths of slab.

The pouring of concrete has been started in connection with the new soil-pressure building, but this work has been much delayed owing to bad weather. The apparatus for measuring soil pressure has been developed in two forms, both of which appear to be capable of accurate work. One form is best adapted to measure vertical pressures under laboratory conditions and the other, which makes use of air pressure, promises to permit of accurate soil-pressure measurements being taken in the field under foundations, back of retaining walls and other structures. These apparatus will be described in two papers to be presented before the American Society for Testing Materials in June. Plans are now under way for conducting cooperative soil-pressure tests with the Office of Public Buildings and Grounds of the War Department, in connection with fills in the 16th Street Park, and the Lincoln Memorial. Plans are also under consideration for cooperation with the New York State Public Service Commission in connection with subway structures.

On March 31, Mr. Goldbeck attended a meeting of Committee C-9 on Concrete, American Society for Testing Materials.



DIVISION OF ROAD ECONOMICS  
J. E. Pennybacker, Chief.

Projects:

Statistical Investigations

Statistical information in regard to road mileage, revenues, and expenditures is complete and on file in this Office for all but about 12 states. M. O. Eldridge expects to make a trip through the States of Tennessee, Louisiana, Mississippi, and Missouri, and while in those states will collect information from counties from which no reports have been received. It is proposed to have this information printed in three or four separate bulletins. That portion which will include the New England, Middle Atlantic, and South Atlantic States is now practically completed.

Statistics in regard to automobile registrations and revenues for 1915 are being checked and prepared for the printer.

The 1915 state highway mileage and expenditures returns have been received from all but 12 states.

State Highway Department Studies

J. D. Fauntleroy, while in North Carolina and West Virginia during March, gathered all necessary information in regard to state highway department studies for those states. Information completed for the other states is being tabulated.

Lectures and Road Models

L. E. Boykin delivered a series of lectures at Elkton, Virginia, beginning March 13, previous to an election for bond issue.

A. S. Brainard delivered an illustrated address on March 3 at York, Pennsylvania, before the board of supervisors.

J. D. Fauntleroy gave an address on March 18 before a general road meeting at Seneca, Virginia. Mr. Fauntleroy also gave an address at Columbia, South Carolina, on March 21, in connection with a proposed bond issue in Richmond County.

J. J. Tobin and A. L. Hooper are now on a good roads train being operated throughout the State of Iowa under the auspices of the Greater Des Moines Committee and in cooperation with the State Highway Department and the railroads. This train was first operated over the Chicago, Northwestern Railroad from March 20 to 27. Beginning on March 28, it has been operated over the Chicago, Rock Island and Pacific Railway, after which it will be operated over the Burlington Lines. It will continue on these lines until April 5. Mr. Tobin and Mr. Hooper are exhibiting a set of road models and delivering a series of lectures.

A set of road models is now on display at San Diego, California, and will remain there throughout the exposition.

An exhibit of models was made at Lakeland, Florida, during the month of March, and from there the models were shipped to St. Augustine, Florida, and displayed there March 23-24. They were then shipped to Columbia, South Carolina, for display.







### Traffic Studies

W. E. Rosengarten is now in Missouri making a traffic study of St. Louis County.

### County Economic Studies

The manuscript for the economic bulletin is finished and will soon be in the hands of the printer.

### Experimental Convict Camp

Reports from the Experimental Convict Camp in Fulton County, Georgia, continue to be very encouraging. In spite of the fact that there are no armed guards and many of the inmates are drawn from the strictly guarded camps, as yet there have been no attempts to escape. Food for the month of February cost at the rate of 18 cents per convict and 26 cents per officer per day. Monthly estimates of the amount of work done are being made and as soon as a sufficient period has elapsed to permit of an estimate of the daily cost of supplies and equipment, a statement of the unit cost of each kind of work will be made. H. S. Parry, J.H.E., has been assigned to assist Mr. Eastham, succeeding Mr. Galbraith, who has gone to Eastville, Virginia.

### Convict Labor Bulletin

Rapid progress has been made during the past month in the preparation of the bulletin, and it is hoped that it will be ready for the printer by the first of June.

### DIVISION OF RURAL ENGINEERING

E. B. McCormick, Mechanical Engineer, Chief.

#### Projects:

#### Domestic Water Supply and Sewage Disposal

G. M. Warren, D.E., has returned from an extended tour of the western short courses. He spoke at 17 meetings, attended by about 2200 people, and had numerous conferences with health officials, manufacturers, and others.

Two sewage-disposal systems consisting of septic tanks and subsoil distribution of the effluents have been designed and the results given out to those correspondents requesting such information.

Plans for the storage and distribution of a farm-water supply using a reinforced-concrete tank and tower for a farm in Maryland are in preparation, also sewage-disposal plans for the same farm.

A bulletin on "Farm Water Systems" is being prepared.

The temporary appointment of two mechanical draftsmen, Horace F. Krieger and Harry V. Winfree, will enable this Division to complete several pieces of work that have been started but laid aside owing to the pressure of more important matters.



### Farm Structures

The farmstead model started some weeks ago is progressing rapidly and its completion is looked for within the next month. The model promises to be a very interesting one and it is hoped that it will be used to good advantage in various agricultural meetings, county fairs, etc. It will also be used in connection with a bulletin which is being prepared on farmstead planning.

The Weekly News Letter for March 29 contains an illustration and description of a small southern farm house, the working drawings for which were recently completed. Prints of these drawings are available to those who contemplate building.

Wallace Ashby, Barn Architect, has recently returned from an extended investigation of the hog-raising industry on Reclamation Projects in the West. He will shortly take up the preparation of drawings for equipment designed to meet the existing conditions in different sections of the country visited.

Designs for two farm houses are in the course of preparation and it is hoped that with the assistance of additional architectural draftsmen to be temporarily appointed these drawings will soon be made available for distribution.

H. L. Brumond has been appointed to the temporary position of architectural draftsman to assist in the completion of designs for several barns that have been started.

Designs for two cottages and milk house are being prepared for the Dairy Division, B. A. I. Drawings for a cheese factory have just been completed.

### Field Experiments

L. L. Beebe, A.M.E., made the final run on the Ohio Post Road between Zanesville and Jacksontown, Ohio, shipped the dynamometer wagon to Greenwood, Miss., and returned to Washington.

The preliminary report covering 3-inch tires has been completed for the Virginia Post Road and Maine Post Road.

A general report covering the traction work so far done by this Division is in course of preparation.

Work is progressing on the final report for the Virginia Post Road.

### DIVISION OF IRRIGATION INVESTIGATIONS Samuel Fortier, Chief.

Projects:

#### Administration

Dr. Fortier expects to leave Washington about the middle of April on a short trip to the Rocky Mountain States. He will go first to Denver to supervise the starting of the experiments at the field laboratory station recently started in the suburbs of that city and to give instructions regarding the work to be carried on in the semi-arid section during the coming season. He will later visit the



Wyoming and possibly the Idaho field, and will probably spend several days in the Poudre Valley of Colorado, where the extensive investigation mentioned in the last month's field letter is under way. He expects to be in the field three or four weeks.

### Utilization of Water

Investigations have been begun in cooperation with the California State Water Commission in investigating duty of water for river irrigation in the Sacramento valley. R. D. Robertson, I.E., made a trip through the rice fields about the middle of March to locate fields on which studies might be conducted.

Mortimer R. Lewis, of Wenatchee, Washington, has been appointed Assistant Irrigation Engineer from the eligible list established by the Civil Service Commission last fall, and has been assigned to take charge of the cooperative duty of water investigations at the Twin Falls, Idaho Farm, succeeding E. A. Beck, Agent, whose resignation was effective the middle of March. Before leaving Twin Falls Mr. Beck completed a report of last year's work, which has been received in Washington.

The trial tank for use in tank irrigation experiments, designed by S. H. Beckett, I. E., was received during March, tested, and found to be satisfactory for conditions at Davis, California, with the exception of several minor details that can be corrected before additional tanks are ordered.

Reports of the investigations of the duty of water for alfalfa in Sacramento Valley during the past three years have been completed by Messrs. R. D. Robertson, I.E., S. H. Beckett, I.E., W. A. Hutchins, A.I.E., and O. W. Israelson, Instructor in Experimental Irrigation in the University of California, and a general report on the work is now being prepared for publication by Frank Adams, I.M.

Milo B. Williams, whose headquarters have been transferred to Berkeley and who is making preliminary investigations on sewage irrigation, visited en route to Berkeley the sewage irrigation farms at Pasadena, Pomona, Whittier, Ontario, San Bernardino, Redlands, Riverside, Bakersfield, Porterville, Fresno, Merced, and other California cities, arriving at Berkeley on March 15, where he consulted with members of the California Irrigation Investigations force. While at Berkeley he conferred with Dean Thomas F. Hunt, of the College of Agriculture, Chief Engineer Gillespie, of the State Board of Health, Professor Chas. Gilman Hyde, of the Sanitary Branch of the Department of Civil Engineering of the University of California, and with others, for the purpose of gaining information on sewage irrigation in California. After leaving Berkeley he returned to southern California to continue his investigations in the field there.

Frank Adams, I.M., gave an illustrated lecture on California irrigation practice before the agricultural club in San Quentin State Prison on March 18.

F. L. Bixby, Irrigation Engineer, is expected in Washington early in April for a conference regarding the pumping and duty of water work to be conducted in Nevada during the coming season, in cooperation with the State Engineer and the State University. Mr. Bixby plans to continue the investigations started last season by C. G. Haskell, and expects to have these under way by the middle of the month. During the past month President Hendricks, of the University, spent several days





in Washington in conference with the Director and Dr. Fortier relative to the cooperative work.

### Flow of Water

A proposal has recently been submitted to the Office by a well-known company engaged in the manufacture of corrugated iron pipes and culverts, which looks to a series of tests to be conducted at the close of similar experiments now on hand on other pipes to determine their carrying capacities. If finally undertaken these tests will be handled on a cooperative basis, the company agreeing to furnish laboratory facilities at its home office, where pipes and culverts of different sizes and a readily controllable water supply will be available. It is not likely that this work will be taken up for several months.

### Pumping for Irrigation

F. W. Stanley made an extended trip over the Everglades section and other parts of Florida during March, assisting in the installation of several plants. He also conducted studies of a number of other plants which include features that are of unusual interest as being adaptable to those particular sections.

J. W. Lough, Commissioner of Irrigation for Kansas, visited the Irrigation Division during the sessions of the Western States Reclamation Conference in March. Mr. Lough, whose work in pumping for irrigation in Western Kansas has attracted much attention in recent years, is expected to give the Division material assistance in experiments planned for the coming season.

### Appliances and Equipment

Wells A. Hutchins, A.I.E., visited Madera, Fairmead, Marysville, Orland, and Davis, in San Joaquin and Sacramento Valleys, California, gathering data on small irrigation reservoirs.

## DIVISION OF DRAINAGE INVESTIGATIONS

S. H. McCrory, Chief.

### Projects:

#### Administration

S. H. McCrory completed the trip west which he commenced February 23. On March 1-2 he was at Onawa, Iowa, where he presented to the landowners and officials the proposed plan of the Office for the Monona-Harrison Drainage District. Meetings held in the court house were largely attended. From Onawa, Mr. McCrory proceeded to Denver, where he reviewed the work performed by L. T. Jessup during the past few months, and arranged with him for future work. Unfortunately, due to weather conditions, the other engineers operating from the Denver Office were not able to return to the Office in time to confer with Mr. McCrory. Leaving Denver on March 6, he arrived at Ames, Iowa, March 7, where he arranged with A. Marston, Dean of the Iowa Engineering Experiment Station, and W. J. Schlick, to conduct cooperatively, run-off investigations in several drainage districts in Iowa. On March 8, Mr. McCrory conferred with the joint Boards of Supervisors





of Monona and Harrison Counties, Iowa, relative to the Monona-Harrison Drainage District. On March 13 he made a preliminary examination of overflowed areas in the vicinity of Coal City, Illinois. From March 14 - 16 he was at Jackson, Tennessee, inspecting the run-off work being conducted by H. S. Andrews on the Forked Deer River. At Jackson he also met O. G. Baxter and conferred with him relative to various projects on which he is engaged. On March 17 Mr. McCrory made a preliminary examination of a proposed levee district along the Ohio River in the vicinity of Rockport, Indiana. After completing this examination he returned to Washington, arriving March 19.

Arrangements have been concluded with the Georgia Geological Survey to make, on a cooperative basis, a reconnaissance of the swamp and overflowed lands of Georgia to determine the location and area of such lands.

Dan S. Helmick of Minnesota has been appointed as Junior Drainage Engineer. For the present he will be assigned to assist Mr. Ramser in run-off work in Iowa.

Quincy C. Ayres, after completing his assignments in Georgia, reported at the Washington Office March 18. On March 27 he left for Hannibal, Missouri, where he will make measurements of seepage through the levees during the high water stages in the Mississippi River. This work is being conducted cooperatively with the Sny Island Levee District, Illinois.

#### Farm Drainage

S. W. Frescoln and W. E. Comfort continued during the month the experiments on the Arlington Farm.

Fred F. Shafer gave attention to a number of requests from farmers in West Virginia.

D. L. Yarnell spent several days at Mt. Jackson, Virginia, staking out additional drains on the Mt. Airy farm. At the same time he secured data relating to the effect of previously installed drains on the movement of ground water. During the latter part of the month he was engaged on surveys for farmers in the vicinity of Cumberland, Maryland.

J. R. Haswell spent several days with farmers on the eastern shore of Maryland.

H. M. Lynde has succeeded in creating quite an interest in tile drainage in North Carolina by contributing short articles to the Extension Service paper of the Experiment Station.

#### Reports Transmitted:

- D 7 Corbitt Farm, Waverley, West Virginia, by Fred F. Shafer.
- D 7 Moyer Farm, Gem, West Virginia, by Fred F. Shafer.
- D 7 Cutlip Farm, Exchange, West Virginia, by Fred F. Shafer.
- D 8X Lynwood Farms, Manchester, North Carolina, by H. M. Lynde.
- D 9 Coast Experiment Station, South Carolina, by F. G. Eason.
- D 11 Willson Tract, Kissimmee, Florida, by C. W. Okey.
- D 31 M. C. Williams Farm, Miami, Florida, by O. G. Baxter.
- D 32 Smith Farm, Sherman, Texas, by O. G. Baxter.



#### Reports Received:

- D 5B Animal Husbandry Farm (cost data) Beltsville, Maryland, by D. L. Yarnell.
- D 5B Dairy Farm, B. A. I. (cost data) Beltsville, Maryland, by D. L. Yarnell.
- D 7 King Farm, Gem, West Virginia, by Fred F. Shafer.
- D 8X Shawondasse Farm, Belhaven, North Carolina, by F. R. Baker.
- D 9 Alderman Farm, Clarendon County, South Carolina, by F. G. Eason.
- D 9 Pedigree Seed Company Farm, Hartsville, South Carolina, by F. G. Eason.
- D 9 Southern Stock and Farming Company Farm, Charleston County, South Carolina, by F. G. Eason.
- D 26B McClellan Farm, near Flint, Alabama, by Lewis A. Jones.
- D 26B Ewing Farm, Perkins, Alabama, by Lewis A. Jones.
- D 26B Tipton Farm, Perry County, Alabama, by Lewis A. Jones.
- D 61 Effect of Tile on Groundwater, Mt. Airy Farm, Mt. Jackson, Virginia, by D. L. Yarnell.

#### Overflowed Land

During the month F. G. Eason was engaged in making preliminary examinations of lands along a number of streams in South Carolina which overflow during high water periods.

O. G. Baxter spent from March 20 - 23 making an examination of the Stranger Creek Drainage District, Kansas.

#### Reports Transmitted:

- D 7 Meadow River Lowlands, Greenbrier County, West Virginia, by Fred F. Shafer.
- D 9 Eighteen Mile Creek, Anderson and Pickens Counties, South Carolina, by F. G. Eason.
- D 19 Sugar Tree Levee District, Carroll Counties, Missouri, by Lewis A. Jones.
- D 23 Stranger Creek Drainage District, Leavenworth County, Kansas, by O. G. Baxter.

#### Reports Received:

- D 9 Marshall Bottoms, Greenwood County, South Carolina, by F. G. Eason.
- D 9 Tillman Bottoms on Wilson Creek, South Carolina, by F. G. Eason.
- D 10 Rose Creek, Georgia, by J. V. Phillips.
- D 10 Shoal Creek Drainage District, Walton County, Georgia, by J. V. Phillips.
- D 22 Drainage District No. 1, Lincoln County, Nebraska, by L. T. Jessup and D. G. Miller.
- D 25 Covington Drainage District, Tennessee, by O. G. Baxter.
- D 26C Luxapallila River, Fayette and Lamar Counties, Alabama, by Lewis A. Jones.
- D 27 Big Blach River District No. 1, Mississippi, by Lewis A. Jones.  
(This report is a revision of that portion of Dept. Bul. 181, which relates to District No. 1)

#### Irrigated Lands

Guy A. Hart spent the early part of the month in New Mexico.

L. T. Jessup has been engaged the greater part of the month in preparing a bulletin in conjunction with D. G. Miller on "The Drainage of Shale Lands."



W. A. Kelly was engaged the entire month with his investigations at Granger, except for a period of about a week when he was at Duvall, Washington, checking high water marks and securing additional data.

Reports Transmitted:

D 35A Renner Tract, Basin, Wyoming, by D. E. Heizer.

Reports Received:

D 32A Lower Rio Grande Valley (Tile projects), Texas, by W. N. Hall.  
D 39A Hooper Drainage District, Hooper, Utah, by W. N. Hall.  
D 39A Plain City Drainage District, Utah, by W. N. Hall.  
D 39A Smithfield Tract No. 1, Utah, by R. A. Hart.  
D 39A Smithfield Tract No. 2, Utah, by R. A. Hart.  
D 39F Report on Observation Well Experiment, Utah, by R. A. Hart.  
D 43B Groundwater Movements, (K. V. E. D.) California, by W. W. Weir.  
D 43B Alkali Determinations, (K. V. E. D.) California, by W. W. Weir.

Swamp Land

On March 25, C. W. Okey left New Orleans to confer with F. E. Staebner relative to the work being conducted in Florida and to arrange for further work.

During the month Messrs. Jones, Phillips, Haswell, Shafer, and Hooper have been engaged compiling data relative to the area of swamp and overflowed land in the United States.

Reports Transmitted:

D 9 Caw Caw Swamp, Brunswick County, North Carolina, by H. M. Lynde.

Run-off Investigations

C. E. Ramser, on March 24, left Washington for Onawa, Iowa, where he will conduct investigations relating to run-off on drainage ditches in western Iowa. These investigations will be conducted in cooperation with the Iowa Engineering Experiment Station which will operate in the north central part of the State. Mr. Ramser will be assisted by Dan S. Helmick and by Guy A. Hart.

Legal, Organization, and Financial

On December 31, 1915, the Supreme Court of New Mexico, in the case of the Dexter-Greenfield Drainage District, rendered a comprehensive decision sustaining the validity of the drainage law. In January, 1916, the Supreme Court of Utah, in construing the validity of the proposed bond issue of the Corinne Drainage District, sustained the validity of the Utah drainage law. Engineers of this Office assisted in drafting both laws.





DIVISION OF ACCOUNTS  
W. C. Wyatt in charge.

A recent decision of the Comptroller holds that where a berth is bought by an employee of the Government and is occupied by two persons, the employee can only be reimbursed for one-half of the cost of same. This ruling also applies to a case where an employee hires a room in a hotel which is shared by another person.

The Auditor has recently called attention to the criticism of the Comptroller of the practice of employees taking subvouchers when paying bills, then being reimbursed for same, when such bills could be paid direct on Form 5 vouchers. Special reference was made recently to a case of auto' hire amounting to \$80, when the entire monthly reimbursement account was less than \$90, and the employee could have saved paying out the money by using a Form 5 voucher. In such cases employees should be very careful to mention in the monthly travel report or project report that the Form 5 voucher was used, and in what amount, in order that the records may be kept in proper form.

A supply of Form 5 vouchers will be sent to employees who request them.

Large bills for auto' hire, livery charges, and other similar expenses incurred where the employee is well known, can usually be handled with Form 5 vouchers without objection from the person rendering this service.

